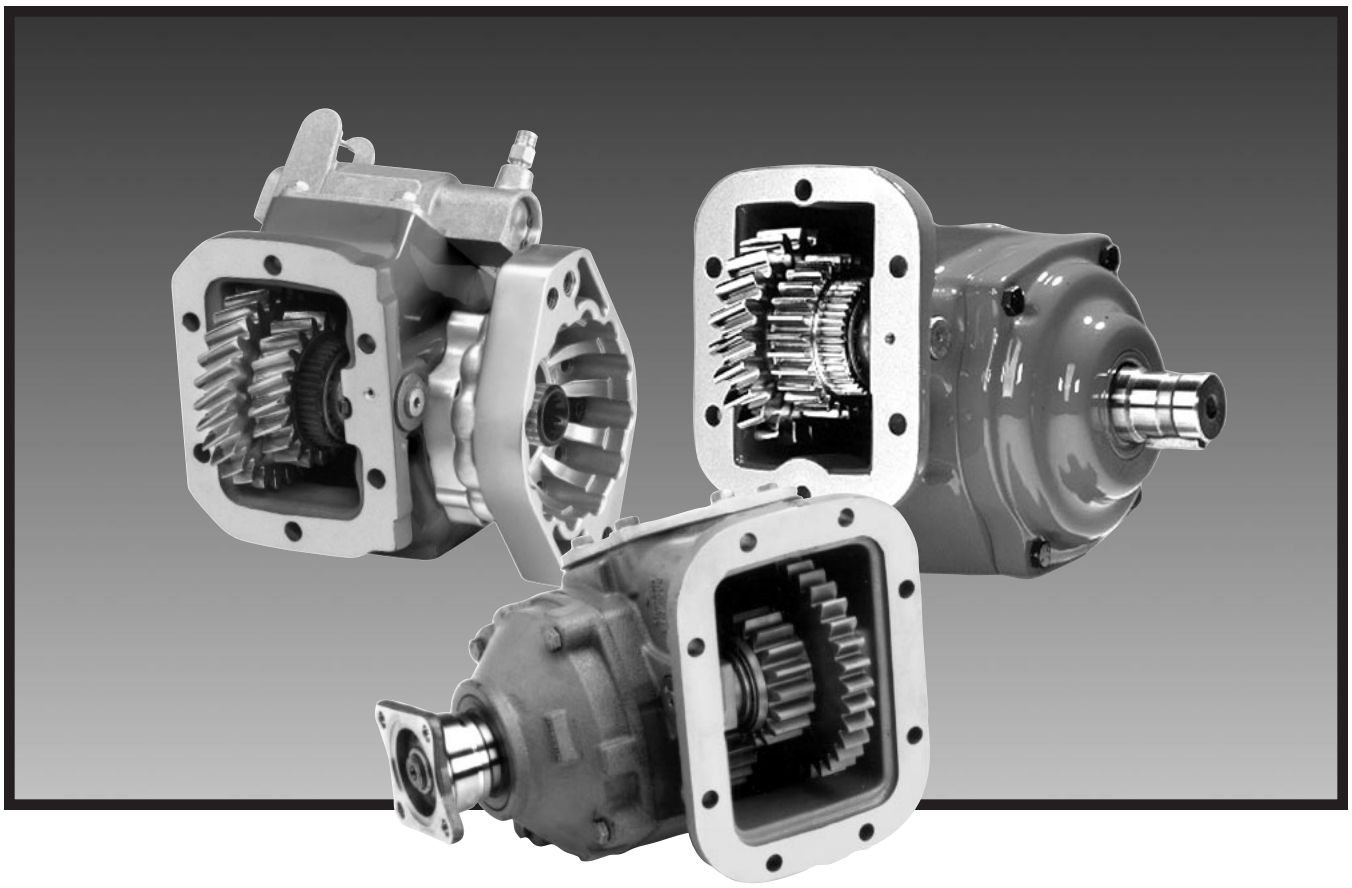
CHELSEA®

Bulletin HY25-1806-M1/US

# Owner's Manual
# Power Take-Offs

Effective: April 2011
Supersedes: HY25-1806-M1/US April 2009



**252 Series**

Parker

## ⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

## Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale".

## Patent Information

The Chelsea® Power Take-Off or its components shipped with this owner's manual may be manufactured under one or more of the following U.S. patents:
4610175 5228355 4597301 5645363 6151975 6142274 6260682 7159701 B2 7690450 B2 7510064
Other patents pending.

© Copyright 2011, Parker Hannifin Corporation, All Rights Reserved



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Contents

**General Information**

General Safety Information ..... 1-2
Foreword ..... 3
Chelsea P.T.O. Safety Label Installation ..... 3-4
Function of Auxiliary Powershift ..... 5-6
Pump Installation ..... 7

**252 Series - Allison Transmission**

**GM3600**

P.T.O. Installation ..... 8-9
Hydraulic Shift Installation ..... 10
Wiring Harness Installation ..... 11
Re-Installing Exhaust ..... 12

**Allison 1000, 2000/2400 Series Transmission**

P.T.O. Installation ..... 13
Hydraulic Shift Installation ..... 14
Wiring Harness Installation ..... 15
Installation Sketch 12V without Speed Limiter (SK 456 Rev A) ..... 16

**252 Series - Dodge w/Aisin Transmission**

Dodge Overview MY2010 & Prior ..... 17
RAM Overview MY2011 & Later ..... 18-19
Installation Instructions (All Model Years) ..... 20-23
Wiring-MY2011 & Later RAM Chassis Cab ..... 24-25
Dodge Wiring Charts (MY2010 and Prior) ..... 26
Installation Sketch without E.O.C. (SK-455 Rev A) (MY2010 and Prior) ..... 27
RAM Wiring Installation Instructions (MY2011 and Later) ..... 28
Installation Sketch without E.O.C. MY2011 & Later (SK-495) (MY2011 and Later) ..... 29

P.T.O. Maintenance ..... 30
Offer of Sale ..... 31



Parker Chelsea
**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Notes



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Safety Information

These instructions are for your safety and the safety of the end user. Read them carefully until you understand them.

## General Safety Information

To prevent injury to yourself and/or damage to the equipment:

- Read carefully all owner's manuals, service manuals, and/or other instructions.
- Always follow proper procedures, and use proper tools and safety equipment.
- Be sure to receive proper training.
- Never work alone while under a vehicle or while repairing or maintaining equipment.
- Always use proper components in applications for which they are approved.
- Be sure to assemble components properly.
- Never use worn-out or damaged components.
- Always block any raised or moving device that may injure a person working on or under a vehicle.
- Never operate the controls of the Power Take-Off or other driven equipment from any position that could result in getting caught in the moving machinery.

## Proper Matching of P.T.O.

**WARNING:** A Power Take-Off must be properly matched to the vehicle transmission and to the auxiliary equipment being powered. An improperly matched Power Take-Off could cause severe damage to the vehicle transmission, the auxiliary driveshaft, and/or the auxiliary equipment being powered. Damaged components or equipment could malfunction causing serious personal injury to the vehicle operator or to others nearby.

## To avoid personal injury and/or equipment damage:

- Always refer to Chelsea catalogs, literature, and owner's manuals and follow Chelsea recommendations when selecting, installing, repairing, or operating a Power Take-Off.
- Never attempt to use a Power Take-Off not specifically recommended by Chelsea for the vehicle transmission.
- Always match the Power Take-Off's specified output capabilities to the requirements of the equipment to be powered.
- Never use a Power Take-Off whose range of speed could exceed the maximum safe speed of the equipment to be powered.

## Cold Weather Operation of Powershift P.T.O.

**WARNING:** During extreme cold weather operation [32°F (0°C) and lower], a disengaged powershift Power Take-Off can momentarily transmit high torque that will cause unexpected output shaft rotation. This is caused by the high viscosity of the transmission oil when it is extremely cold. As slippage occurs between the Power Take-Off clutch plates, the oil will rapidly heat up and the viscous drag will quickly decrease.

The Power Take-Off output shaft rotation could cause unexpected movement of the driven equipment resulting in serious personal injury, death or equipment damage.

To avoid personal injury and/or equipment damage:

- Driven equipment must have separate controls.
- The driven equipment must be left in the disengaged position when not in operation.
- Do not operate the driven equipment until the vehicle is allowed to warm up.

**This symbol warns of possible personal injury.**


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Safety Information

## Rotating Auxiliary Driveshafts

**WARNING:**

- Rotating auxiliary driveshafts are dangerous. You can snag clothes, skin, hair, hands, etc. This can cause serious injury or death.
- Do not go under the vehicle when the engine is running.
- Do not work on or near an exposed shaft when the engine is running.
- Shut off the engine before working on the Power Take-Off or driven equipment.
- Exposed rotating driveshafts must be guarded.

## Guarding Auxiliary Driveshafts

**WARNING:** We strongly recommend that a Power Take-Off and a directly mounted pump be used to eliminate the auxiliary driveshaft whenever possible. If an auxiliary driveshaft is used and remains exposed after installation, it is the responsibility of the vehicle designer and P.T.O. installer to install a guard.

## Using Set Screws

**WARNING:** Auxiliary driveshafts may be installed with either recessed or protruding set screws. If you choose a square head set screw, you should be aware that it will protrude above the hub of the yoke and may be a point where clothes, skin, hair, hands, etc. could be snagged. A socket head set screw, which may not protrude above the hub of the yoke, does not permit the same amount of torquing as does a square head set screw. Also a square head set screw, if used with a lock wire, will prevent loosening of the screw caused by vibration. Regardless of the choice made with respect to a set screw, an exposed rotating auxiliary driveshaft must be guarded.

**IMPORTANT: Safety Information and Owner's Manual**
Chelsea Power Take-Offs are packaged with safety information decals, instructions, and an owner's manual. These items are located in the envelope with the P.T.O. mounting gaskets. Also, safety information and installation instructions are packaged with some individual parts and kits. Be sure to read the owner's manual before installing or operating the P.T.O. Always install the safety information decals according to the instructions provided. Place the owner's manual in the vehicle glove compartment.

**WARNING: Operating the P.T.O. with the Vehicle in Motion**
Some Power Take-Offs may be operated while the vehicle is in motion. To do so, the P.T.O. must have been properly selected to operate at highway speeds and correctly matched to the vehicle transmission and the requirements of the driven equipment.

If in doubt about the P.T.O.'s specifications and capabilities, avoid operating the P.T.O. when the vehicle is in motion. Improper application and/or operation can cause serious personal injury or permanent failure of the vehicle, the driven equipment, and/or the P.T.O.

Always remember to disengage the P.T.O. when the driven equipment is not in operation.

**This symbol warns of possible personal injury.**


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Foreword

This booklet will provide you with information on correct installation of Chelsea® Power Take-Offs (P.T.O.'s). Proper installation and set up procedures will help you get additional and more profitable miles from your truck equipment and components.

It is important that you be sure that you are getting the right transmission/P.T.O. combination when you order a new truck. An inadequate transmission will overwork any P.T.O. in a short period of time. In addition, a mismatched transmission and P.T.O. combination can result in unsatisfactory performance of your auxiliary power system from the start.

If you have questions regarding correct P.T.O. and transmission combination, please contact your local Chelsea® Auxiliary Power Specialist. They can help you select the properly matched components to insure correct and efficient applications.

## Chelsea P.T.O. Safety Label Instructions

1. The two black and orange on white 5" x 7" pressure sensitive vinyl labels, part number 379274; must be placed on the vehicle frame rails (one (1) on each side), in a position that would be HIGHLY visible to anyone that would go under the truck near the P.T.O. rotating shaft. If the vehicle is to be painted after these labels are installed, cover them with two (2) blank masking covers. Remove the masking covers after painting.

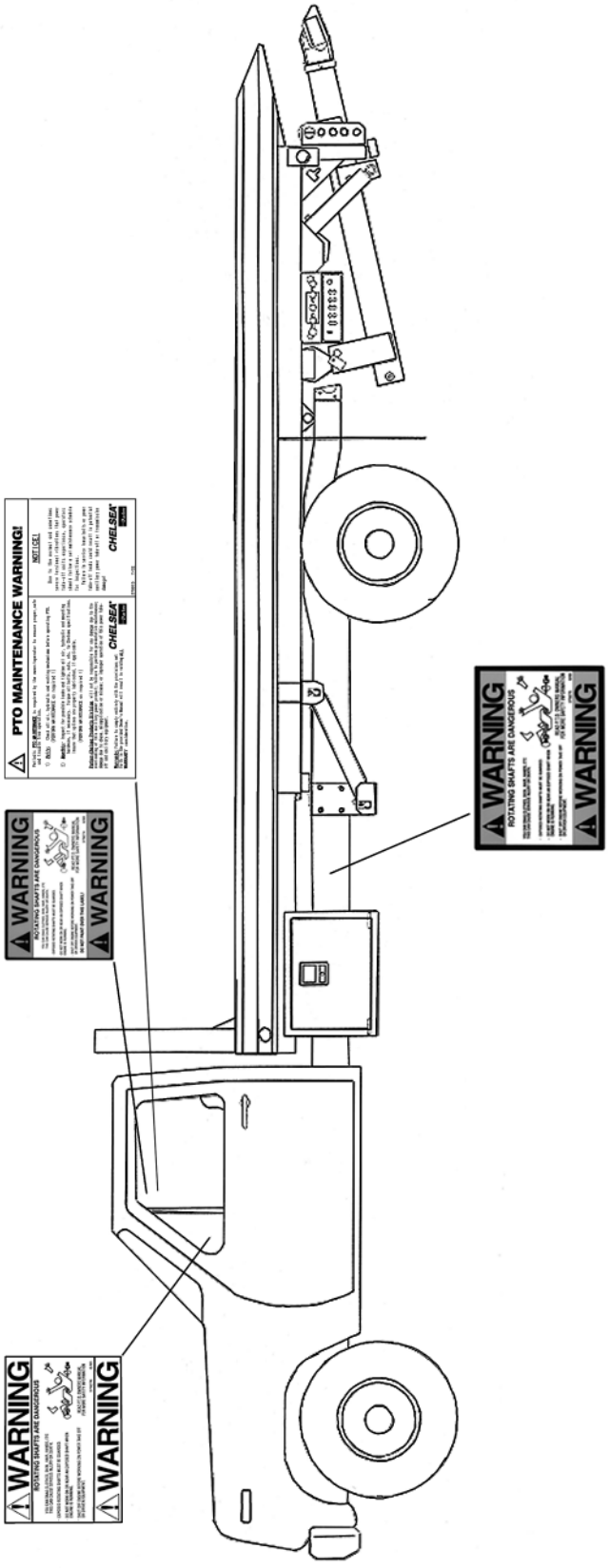
2. Place the one (1) black and orange on white 3.5" x 5" pressure sensitive vinyl label, part number 379275, on the visor nearest the operator of the vehicle, this must be placed near the P.T.O. visor label.

3. Place the one (1) red and white with black lettering 3.5" x 7.5" sensitive vinyl label, part number 379915 on the opposite side of the visor from the above label # 379275

4. Place the one (1) white and black heavy duty card, part number 379276, in the vehicle glove box. Again in a position highly visible to the operator, for example: try to place this card on top of whatever may be in the glove box.

If you require labels, please order part number 328946X at no charge from your local Chelsea Warehouse or send request direct to:

**Parker Hannifin Corporation**
**Chelsea Products Division**
**8225 Hacks Cross Road**
**Olive Branch, MS 38654**
**Customer Service: (662) 895-1011**






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Function of Auxiliary Power Shafts

An auxiliary power shaft transmits torque from the power source to the driven accessory. The shaft must be capable of transmitting the maximum torque and R.P.M. required of the accessory, plus any shock loads that develop.

An auxiliary power shaft operates through constantly relative angles between the power source and the driven accessory, therefore, the length of the auxiliary power shaft must be capable of changing while transmitting torque. This length change, commonly called "slip movement", is caused by movement of the powertrain due to torque reactions and chassis deflections.

Joint operating angles are very important in an auxiliary power joint application. In many cases, the longevity of a joint is dependent on the operating angles. (See chart below)

This information is limited to 1000 through 1310 series applications. For applications requiring a series larger than 1310, contact your local Chelsea distributor.

## Determining Shaft Type

1) Solid or tubular?
   a) In applications requiring more than 1000 R.P.M. or where the application necessitates a highly balanced auxiliary power shaft, a tubular shaft should be used.
   b) Spicer's solid shafting auxiliary power joints are designed for 1000 or less R.P.M. intermittent service such as:
      Driving small hydraulic pumps
      Driving winches
      Driving low speed product pumps
2) Joint Series should be determined using the chart on the following page.

| SPICER® UNIVERSAL JOINT OPERATING ANGLES | | | |
|---|---|---|---|
| **PROP. SHAFT R.P.M.** | **MAX. NORMAL OPERATING ANGLE** | **PROP. SHAFT R.P.M.** | **MAX. NORMAL OPERATING ANGLE** |
| 3000 | 5° 50' | 1500 | 11° 30' |
| 2500 | 7° 00' | 1000 | 11° 30' |
| 2000 | 8° 40' | 500 | 11° 30' |

Above based on angular acceleration of 100 RAD/SEC$^2$


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Spicer® Universal Joint Engineering Data

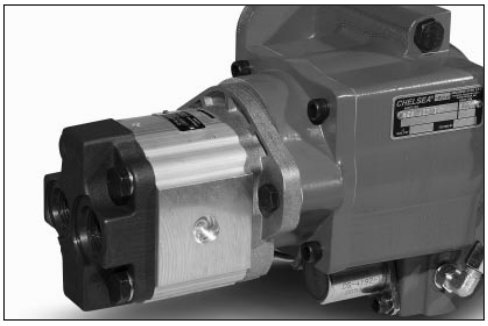
| Joint Series | 1000 | 1100 | 1280 | 1310 |
|---|---|---|---|---|
| **Torque Rating** | | | | |
| Automotive (Gas or Diesel Engine) Lbs. ft. | | | | |
| Continuous | 50 | 54 | 95 | 130 |
| **Tubing** | | | | |
| Diameter | 1.750 | 1.250 | 2.500 | 3.00 |
| Wall Thickness | .065 | .095 | .083 | .083 |
| W = Welded S = Seamless | W | S | W | W |
| **Flange Diameter** (Swing Diameter) | | | | |
| Rectangular Type | 3.500 | 3.500 | 3.875 | 3.875 |
| **Bolt Holes** - Flange Yoke | | | | |
| Circle | 2.750 | 2.750 | 3.125 | 3.125 |
| Diameter | .312 | .312 | .375 | .375 |
| Number | 4 | 4 | 4 | 4 |
| Male Pilot Dia. | 2.250 | 2.250 | 2.375 | 2.375 |
| **Distance Across Lugs** | | | | |
| Snap Ring | 2.188 | 2.656 | 3.469 | 3.469 |
| Construction | | | | |
| **Bearing Diameter** | .938 | .938 | 1.062 | 1.062 |

**Maximum Operating Speed * By Tube Size, Solid Shaft Size, and Length**
***(For speed below 500 R.P.M. or over 2500 R.P.M., contact your Chelsea Distributor)**

| Tubing Dia. & Wall Thickness Joint & Shaft (W=Welded S=Seamless) | Max. Installed Length in Inches for Given R.P.M. Centerline to Centerline of Joints for a Two Joint Assembly or Centerline of Joint to Centerline of Center Bearing for a Joint & Shaft R.P.M. - Revolutions per Minute | | | | |
|---|---|---|---|---|---|
| | **500** | **1000** | **1500** | **2000** | **2500** |
| 1.750" X .065" W | 117" | 82" | 67" | 58" | 52" |
| 1.250" X .095" S | 91" | 64" | 52" | 45" | 40" |
| 2.500" X .083" W | 122" | 87" | 70" | 62" | 55" |
| 3.000" X .083" W | - | - | - | 85" | 76" |
| Solid Shaft Diameter | | | | | |
| .750" | 60" | 42" | 35" | 30" | 27" |
| .812" | 62" | 44" | 36" | 31" | 28" |
| .875" | 65" | 46" | 37" | 32" | 29" |
| 1.000" | 69" | 49" | 40" | 35" | 31" |
| 1.250" | 77" | 55" | 45" | 39" | 35" |

# Pump Pre-Installation

## Installing Pump to P.T.O.



1. When installing the 252 Series on either the Allison or Aisin Transmission one recommendation is to install the Commercial Pump prior to Power Take-Off (P.T.O.) installation.

2. If the Commercial Pump was ordered with the Power Take-Off it will come with a Pump Installation Kit 329296-4X. This kit will include two bolts (378431-11) for mounting the pump to the P.T.O. and a small packet of anti-fretting grease (379688).

3. Before installing the pump to the P.T.O. apply grease to the P.T.O. female splined shaft and to the male pump shaft.

4. Install to pump to the P.T.O. using the bolts provided with the kit. Torque the two pump bolts to 32-37 Lbs. ft. [45-50 N.m].

5. You are now ready to install the Power Take-Off to the Transmission.

6. Steps 3 & 4 should be followed even if the pump is not installed at this time, but after the P.T.O. is mounted to the transmission.


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission (GM 3600 Chassis)

1. Before installing the P.T.O to the transmission, you may need to remove the two exhaust pipes that are on the right passenger side of the vehicle and next to the Power Take-Off opening (Fig. 1). View is an Extended Cab with L18 engine exhaust.

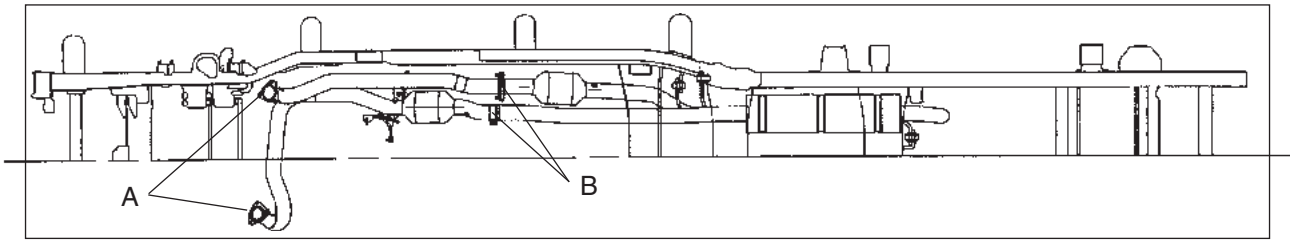



Figure 1

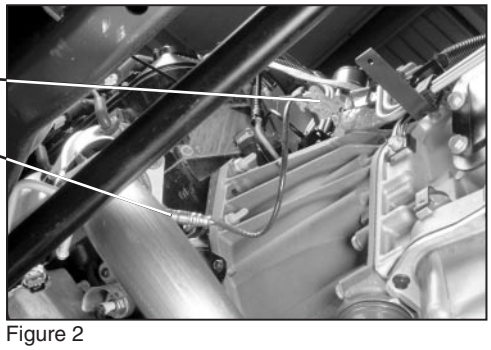



Figure 2

2. Disconnect the connection for the oxygen sensor or remove the oxygen sensor from the exhaust pipe (Fig. 2). Next remove the three (3) bolts that secure the exhaust pipe to the exhaust pipe header (A) in (Fig. 1) (Fig. 3).

   This should be done for the left and right exhaust pipes. Remove the attaching bolts for each exhaust pipe at the rear attaching flange (B) in (Fig. 1).

Figure 3

3. Remove the lower transmission heat shield [1] and P.T.O. aperture plate [2] from the transmission (Figs. 4 & 5).

**NOTE:** Make sure aperture surface is clean and dry before proceeding.

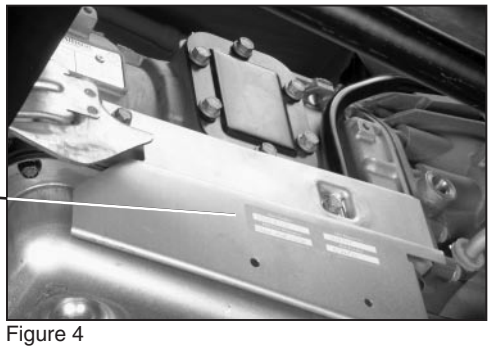



Figure 4

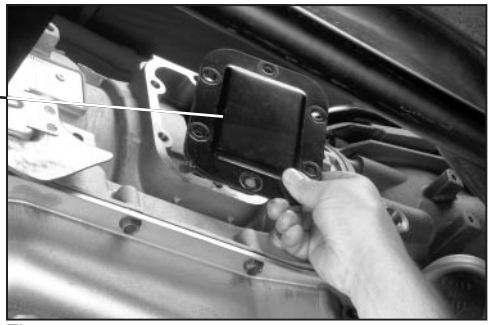



Figure 5



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission (GM 3600 Chassis) (Continued)

4. Install the proper studs (379428-14 furnished with P.T.O.) in the P.T.O. aperture pad. The stud kit furnished with the P.T.O. contains five (5) studs and one (1) capscrew and have pre-applied locking/ sealing compound. Do not install a stud in the top hole on the aperture pad, this is for the capscrew (See Fig. 6) for proper placement of studs. Tighten studs securely and torque to 17-19 Lbs. ft. (23.05- 25.76 N.m).

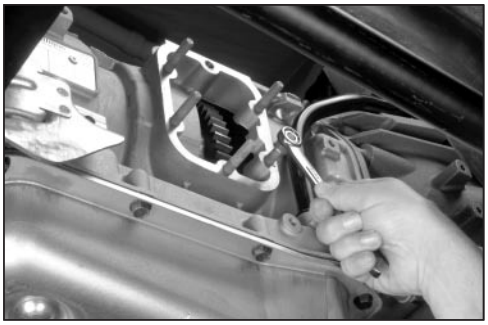


Figure 6

**CAUTION:** Over tightening of studs may damage stud and/or transmission threads.

5. Place the gasket (35-P-41) provided with the P.T.O. over the studs (Fig. 7). Only one gasket is required because the 252 Series P.T.O. does not require the backlash to be set.

6. Secure the P.T.O./Pump to the transmission. Install the long bolt to the top hole in the P.T.O. and the flange nuts (provided with the P.T.O.) to the studs (Fig. 8).

Figure 7

**NOTE:** Flange nuts do not require lockwashers.

7. Fasten the Power Take-Off to the transmission. Torque the five (5) flange nuts (379744) to 35-40 Lbs. ft. [47-54 N.m].

   Torque the capscrew (379578-48) to 30-35 Lbs. ft. [41-47 N.m]

Figure 8

## Installation of the P.T.O. to the Transmission (GM 3600 Chassis) (Continued)

8. Next we will move to the installation of the plumbing. Remove the transmission oil filter located on the lower left side of the transmission (Fig. 9). Next remove the main pressure port plug next to the filter and install the 90° O-Ring fitting (379486). (Fig. 10)

Figure 9

**WARNING:** Oil may be hot. Use extreme caution to ensure that you do not accidentally come in contact with hot oil.

9. Attach the hydraulic hose to the transmission main pressure port. Fitting as shown in (Fig. 11). Re-install the filter at this time.

   Next attach the other end of the hose to the P.T.O. 90° O-Ring fitting (379486) as shown in (Fig. 12)

Figure 10

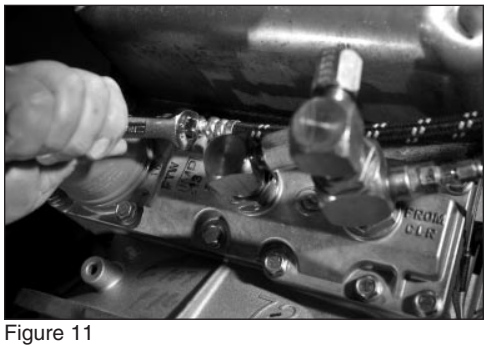


Figure 11

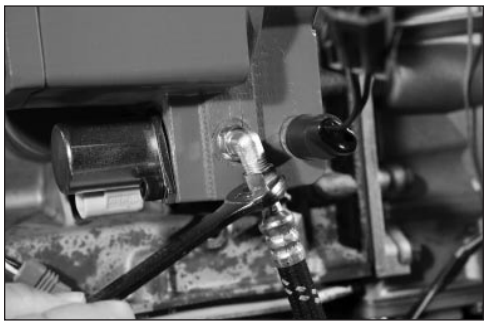


Figure 12

**This symbol warns of possible personal injury.**



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission (GM 3600 Chassis) (Continued)

10. Reattach the OE supplied transmission heat shield to the bottom of the transmission. Torque the bolts to 13 Lbs. ft. [17 N.m] (Fig. 13).

Figure 13

### Model Year 2007-2009 GM 3500 Series Wiring Harness - 252 Series

11. For 2007-2009 model year "C/K" Series 3500 trucks equipped with Allison 1000, 2000/2400 transmission, Chelsea wiring harness 329620X is required to complete the truck to Power Take-Off (P.T.O.) interface.

12. Pressure switch connections (Fig. 14).
Grey w/green connector to grey pressure switch connector.

Figure 14

13. Solenoid valve connections (Fig. 15).
Grey w/blue connector to white solenoid connector.

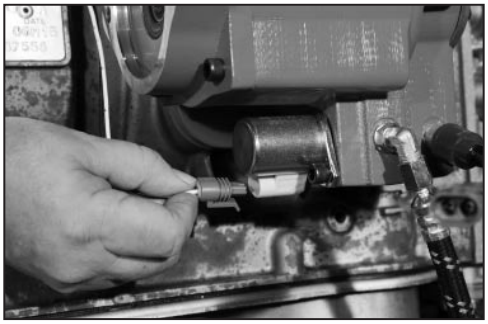
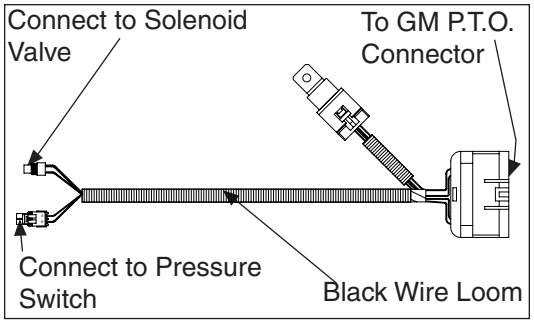


Figure 15

**NOTE:** After installing the P.T.O. and harness, all trucks will need to be reprogrammed by a GM dealer. The P.T.O. Load Feedback and P.T.O. Engage Relay functions need to be reset to ENABLE before the system will function properly.

To change Stationary Preset P.T.O. to Stationary Variable P.T.O. or Mobile Variable P.T.O. the BCM (Body Control Module) must be reprogrammed.

GM UI (Upfitter Integration) Bulletin #80 is recommended to assist installers and end-users in understanding the P.T.O system on these trucks. (www.gmupfitter.com)



**Part Number 329620X**



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission (GM 3600 Chassis) (Continued)

14. Reinstall the two engine exhaust pipes at this time. Torque the rear flange bolts to 30 Lbs. ft. [40 N.m] and the exhaust manifold pipe nuts to 39 Lbs. ft. [50 N.m] (Fig. 16).

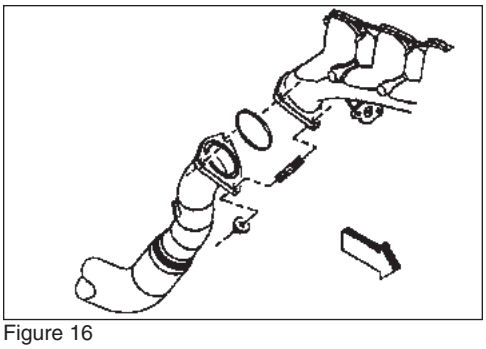


Figure 16

15. Reattach the oxygen sensor at this time also. If the oxygen sensor was removed at the pipe, torque to 31 Lbs. ft. [42 N.m]. If the sensor was disconnected at the plug, snap back into place (Fig. 17).

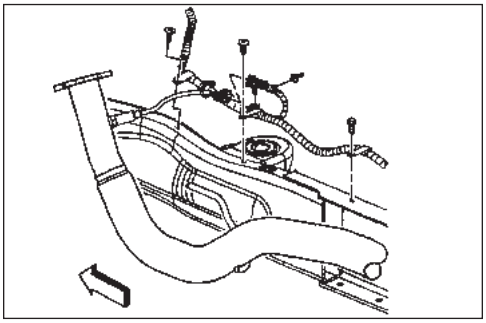


Figure 17



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission (Allison 1000, 2000/2400)

1. Remove P.T.O. aperture plate from the transmission. (Fig. 1)

**WARNING:** Oil may be hot. Use extreme caution to ensure that you do not accidentally come in contact with hot oil.

**NOTE:** Make sure aperture surface is clean and dry before proceeding.

Figure 1

2. Install the proper studs (379428-14 furnished with P.T.O.) in the P.T.O. aperture pad. The stud kit furnished with the P.T.O. contains five (5) studs and one (1) capscrew and have pre-applied locking/ sealing compound. Do not install a stud in the top hole on the aperture pad, this is for the capscrew (See Fig. 2) for proper placement of studs. Tighten studs securely and torque to 17-19 Lbs. ft. (23 - 25 N.m).

**CAUTION:** Over tightening of studs may damage stud and/or transmission threads.

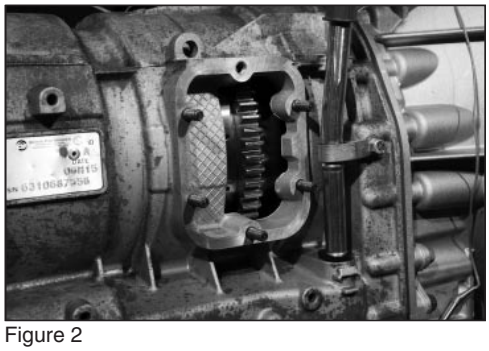


Figure 2

3. Place the gasket (35-P-41) provided with the P.T.O. over the studs (Fig. 3). Only one gasket is required because the 252 Series P.T.O. does not require the backlash to be set.

4. Secure the P.T.O./Pump to the transmission. Install the long bolt to the top hole in the P.T.O. and the flange nuts (provided with the P.T.O.) to the studs (Fig. 4).

**NOTE:** Flange nuts do not require lockwashers.

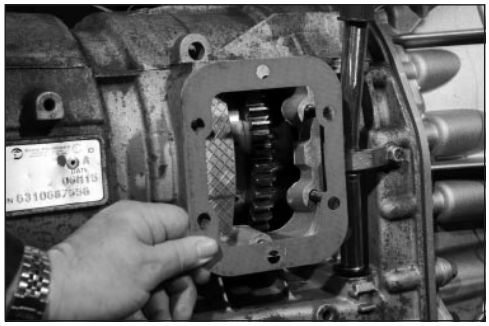


Figure 3

5. Fasten the Power Take-Off to the transmission. Torque the five (5) flange nuts (379744) to 35-40 Lbs. ft. [47-54 N.m].

   Torque the capscrew (379578-48) to 30-35 Lbs. ft. [41-47 N.m]

Figure 4

**This symbol warns of possible personal injury.**



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission (Allison 1000, 2000/2400)

6. Remove the transmission oil filter located on the lower left side of the transmission (Fig.. 5). Next remove the main pressure port plug next to the filter and install the 90° O-Ring fitting (379486). (Fig. 6)

Figure 5

**WARNING:** Oil may be hot. Use extreme caution to ensure that you do not accidentally come in contact with hot oil.

7. Attach the hydraulic hose to the transmission main pressure port. Fitting as shown in (Fig. 7). Re-install the filter at this time.

   Next attach the other end of the hose to the P.T.O. 90° O-Ring fitting (379486) as shown in (Fig. 8)

Figure 6

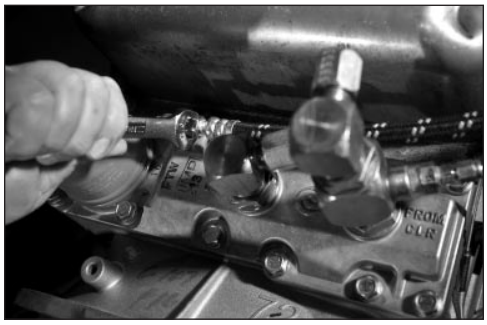


Figure 7

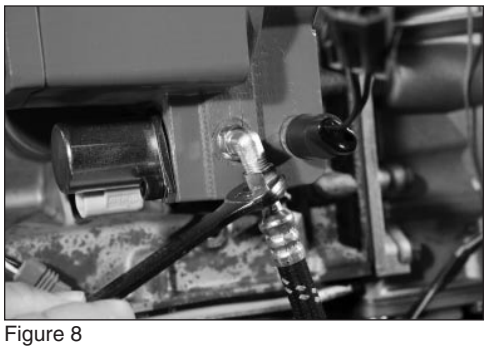


Figure 8

**This symbol warns of possible personal injury.**



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission (Allison 1000, 2000/2400)

**NOTE:** If using the GM provided in-dash switch, skip to item # 9

8. Install the P.T.O. rocker switch and bracket in the cab. Under the vehicle connect the two Packard connectors.

   A) The gray w/green male harness connector to the gray pressure female connector. (Fig. 9)

   B) The gray male w/blue connector to the white solenoid female connector. (Fig. 10)

   C) Route the other end of the Chelsea wiring over the transmission and into the cab and connect wires as illustrated on page 16.

Figure 9

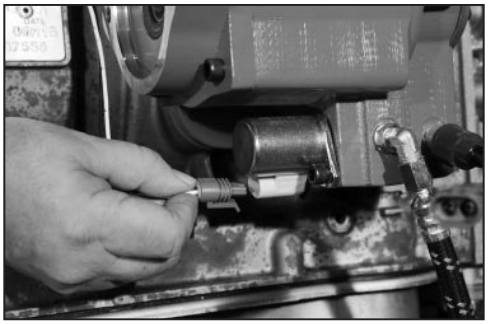


Figure 10

## GM "C/K" Series P.T.O. Wiring Harness

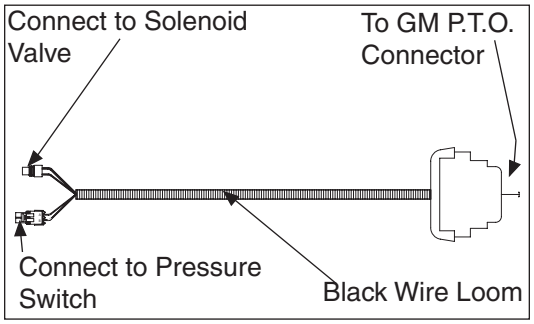
9. For model year 2003 and higher GM "C/K" Series 4500, 5500, 6500, 7500 and 8500 trucks may be equipped with the Allison 1000, 2000/2400 transmissions. In these vehicles GM Truck has integrated a P.T.O. connector, located in the right hand engine compartment area. A Power Take-Off switch has also been incorporated into the GM dash panel to control P.T.O. operation. With the P.T.O. option ordered on the truck, the P.T.O. connector and in-dash switch simplify the interface for the body builder.

   In order for the customer to utilize the full capability of the P.T.O./transmission, Chelsea has designed a wiring harness that must be used between the GM P.T.O. connector and the Chelsea Power Take-Off. These are for P.T.O. Non E.O.C. applications only.

   The main purpose of the wiring harness on the Allison 1000, 2000/2400 transmissions will be to engage the torque converter lock-up clutch. The harness will also allow the end-user to utilize the stalk-mounted cruise control to control Power Take-Off R.P.M.

   See wiring harness part number 329619X for the 252 Series Power Take-Offs.

**Model Year 2003 and Higher GM "C" Series Wiring Harness for 252 Series**




**Part Number 329619X**

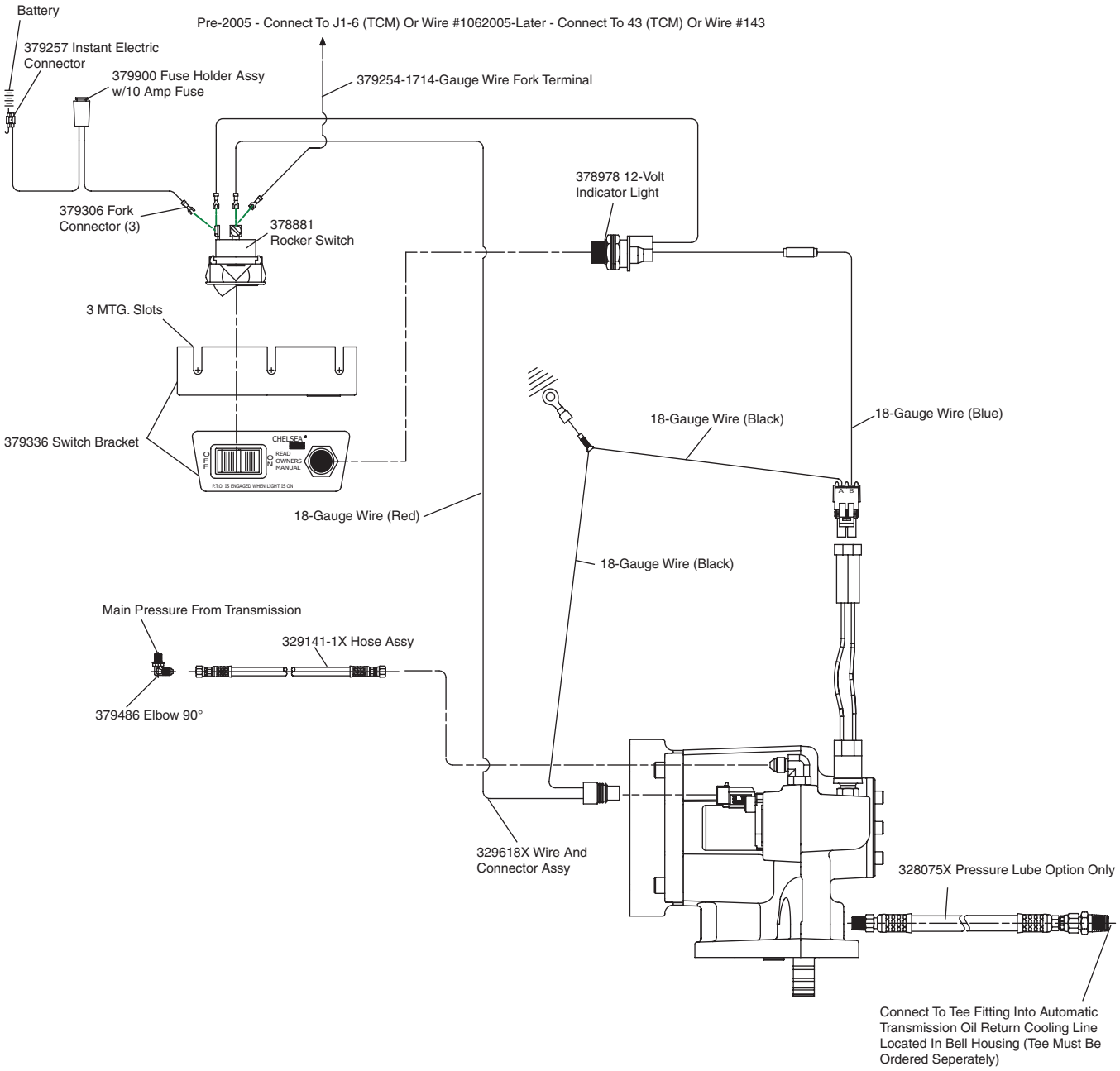
**NOTE:** For 2006 Model Year Chev. Kodiak and GMC Topkick C4500-C7500 Series with 6.6L Diesel or 8.1L Gas engines and Allison 1000/2200/2300 Series transmission. The P.T.O. may not operate properly due to a GM change in feedback logic in the TCM. Please refer to GM UI Bulletin#76 REV. 1 dated 6/09/2006 or latest revision for complete details.



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation Sketch 12V without Speed Limiter for Allison 1000, 2000/2400 (SK-456 Rev A)

329296-8X (12V Installation Kit)


Battery
Pre-2005 - Connect To J1-6 (TCM) Or Wire #1062005-Later - Connect To 43 (TCM) Or Wire #143
379257 Instant Electric Connector
379900 Fuse Holder Assy w/10 Amp Fuse
379254-1714-Gauge Wire Fork Terminal
378978 12-Volt Indicator Light
379306 Fork Connector (3)
378881 Rocker Switch
3 MTG. Slots
379336 Switch Bracket
CHELSEA
READ OWNERS MANUAL
P.T.O. IS ENGAGED WHEN LIGHT IS ON
18-Gauge Wire (Black)
18-Gauge Wire (Blue)
18-Gauge Wire (Red)
18-Gauge Wire (Black)
Main Pressure From Transmission
329141-1X Hose Assy
379486 Elbow 90°
329618X Wire And Connector Assy
328075X Pressure Lube Option Only
Connect To Tee Fitting Into Automatic Transmission Oil Return Cooling Line Located In Bell Housing (Tee Must Be Ordered Seperately)



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Dodge Overview (MY2010 & Prior)

### P.T.O. Operation

The 3500/4500/5500 Dodge Chassis Cab vehicle, when equipped with either the automatic Aisin 6 speed or manual G-56 6 speed transmissions, will allow for an aftermarket upfit with a transmission driven P.T.O. (Power Take-Off). The customer will have the ability to operate the P.T.O. in either a "stationary" or "mobile" mode. The vehicles will be factory set to the "stationary" mode. In order to select the "mobile" mode a DaimlerChrysler Dealership is required to modify the vehicles settings using their proprietary Dealer service tool.

### Stationary Mode

To operate the P.T.O. in this mode the vehicle must meet the following conditions:
- Be in "park" positions (vehicles equipped with automatic transmission)
- Up fitter provider (on/off) switch has been activated
- Parking brake applied (vehicles equipped with manual transmission)
- Vehicle must be running
- No vehicle, brake or clutch switch faults present
- P.T.O. must be correctly installed using the vehicle provided circuits

The customer has the choice to operate the P.T.O. by utilizing the cruise control switches or by utilizing a remote control (provided by the P.T.O. supplier). To operate the feature using the cruise control switches the customer must first activate the up fitter provided on/off switch. Next, the cruise control "on" switch is selected. Following this step the "set" switch must be depressed. The vehicle is now in the P.T.O. mode and is ready for use. In order to increase or decrease the engine idle speed, to optimize the P.T.O. function, the "accel" and "decel" cruise switches can be used respectively. To disengage P.T.O. operation and return to "standard vehicle operation" simply turn the up fitter provided on/off switch to the off position.

To operate the P.T.O. via a remote switch the customer must make sure the above conditions are met. It is vital for proper operation that the P.T.O. and remote have been installed correctly paying special attention to ensure the vehicle provided wiring has been connected properly. This is the responsibility of the installer of the P.T.O. and switches/remote system. It is the responsibility of the P.T.O. manufacturer to ensure that their electrical (switches and remote) system is compatible with the vehicle's electrical architecture and software functionality.

### Mobile Mode

To operate the P.T.O. in this mode the vehicle must meet the following conditions:
- Dealer selected "mobile" mode activated via Dealer proprietary service tool
- Up fitter provider (on/off) switch has been activated
- Vehicle must be in "park" or "drive" position (vehicles equipped with automatic transmission)
- Parking brake must not be applied
- No vehicle, brake or clutch switch faults present
- Vehicle must be running
- P.T.O. must be correctly installed using the vehicle provided circuits

The customer may choose to use the P.T.O. while the vehicle is moving. To do so the P.T.O. function must be activated prior to taking the vehicle out of "park". This is accomplished by activating the up fitter provided P.T.O. on/off switch. At this point the customer may place the vehicle in a forward or reverse gear and have P.T.O. operation. To disengage P.T.O. operation and return to "standard vehicle operation" simply turn the up fitter provided on/off switch to the off position.

**NOTE:** For application specific information with respect to P.T.O. and pump requirements and additional vehicle information (wiring schematics, preset idle values, engine speed limits, and vehicle hardware and software requirements) please refer to the Dodge Body Builders Guide by accessing "Wiring Diagrams" and choosing the appropriate links.

## RAM Overview (MY2011 & Later)

### P.T.O. Operation

The 3500/4500/5500 Ram Chassis Cab vehicle, when equipped with either the automatic Aisin 6spd or manual G-56 6 speed transmissions, will allow for an aftermarket upfit with a transmission driven P.T.O. (Power Take-Off). The customer will have the ability to operate the P.T.O. in either a "stationary" or "mobile" mode. The vehicles will be factory set to the "stationary" mode. In order to select the "mobile" mode a Chrysler Group LLC Dealership is required to modify the vehicles settings using their proprietary Dealer service tool. Under normal operation the vehicle will go to a 900 rpm when P.T.O. is engaged. By utilizing the cruise switches the idle speed can then be adjusted to between 900 and 2000 rpm's.

### Stationary Mode

This feature interacts with the transmission to utilize an auxiliary shaft to drive equipment. Activated by a switch inside the cab, this feature operates only when the vehicle is stationary. The input is switched to ground. Once active, the engine speed increased by holding the RES ACCEL button on the steering wheel or decreased by holding the COAST button. Stationary P.T.O. is available only when the vehicle is stationary. When the truck is equipped with an automatic transmission, it must be in Park and the service brake must be released and functional. When the truck is equipped with a manual transmission, the Parking Brake must be Set and the service brake must be released and functional.

To operate the P.T.O. in this mode the vehicle must meet the following conditions:

- Be in "park" position ( vehicles equipped with automatic transmission)
- Upfitter provider (on/off) switch has been activated
- Parking brake applied (vehicles equipped with manual transmission)
- Clutch not depressed (clutch interlock switch)
- Vehicle must be running
- No transmission, engine, accelerator, brake or clutch switch faults present
- P.T.O. must be correctly installed using the vehicle provided circuits

The customer has the choice to operate the P.T.O. by utilizing the cruise control switches or by utilizing a remote control (provided by the P.T.O. supplier). To operate the feature using the cruise control switches the customer must first activate the up fitter provided on/off switch. The vehicle is now in the P.T.O. mode and is ready for use. In order to increase or decrease the engine idle speed, to optimize the P.T.O. function, the "accel" and "decel" cruise switches can be used respectively. To disengage P.T.O. operation and return to "standard vehicle operation" simply turn the up fitter provided on/off switch to the off position.

To operate the P.T.O. via a remote switch the customer must make sure the above conditions are met. It is vital for proper operation that the P.T.O. and remote have been installed correctly paying special attention to ensure the vehicle provided wiring has been connected properly. This is the responsibility of the installer of the P.T.O. and switches/remote system. It is the responsibility of the P.T.O. manufacturer to ensure that their electrical (switches and remote) system is compatible with the vehicle's electrical architecture and software functionality.

## RAM Overview (MY2011 & Later) (Continued)

### Mobile Mode

This feature interacts with the transmission auxiliary shaft. The feature is activated by a switch (closed to ground) in the cab after selected by a service tool. When active, this feature limits engine speed and road speed to calibrated values. When this feature is selected stationary P.T.O. and Remote P.T.O. features are not available. To operate the P.T.O. in this mode the vehicle must meet the following conditions:

- Dealer selected "mobile" mode activated via Dealer proprietary service tool
- Upfitter provider (on/off) switch has been activated
- Vehicle must be in "park" or "drive" position (vehicles equipped with automatic transmission)
- Parking brake must not be applied
- Clutch not depressed (clutch interlock switch)
- No transmission, engine, accelerator, brake or clutch switch faults present
- Vehicle must be running
- P.T.O. must be correctly installed using the vehicle provided circuits

The customer may choose to use the P.T.O. while the vehicle is moving. To do so the P.T.O. function must be activated prior to taking the vehicle out of "park". This is accomplished by activating the up fitter provided P.T.O. on/off switch. At this point the customer may place the vehicle in a forward or reverse gear and have P.T.O. operation. To disengage P.T.O. operation and return to "standard vehicle operation" simply turn the up fitter provided on/off switch to the off position.

### Remote Stationary mode

This feature interacts with the transmission to utilize an auxiliary shaft to drive equipment. Activated by a switch outside of the cab, this feature operates only when the vehicle is stationary. The input is switched to ground. Once active, the engine speed is changed when the switch changes from Off (open circuit) to On (closed to ground) or toggled in less than ½ second. Toggling the switch On-Off-On triggers the engine to change to the next calibrated engine speed. This can be repeated for up to five engine speed settings. Repeated toggles cycles through the engine speed 1-2-3-4-5-1-2 and so on. Remote P.T.O. can be calibrated for one to five selectable engine speeds. The engine speeds are also calibrated. Remote P.T.O. feature has a higher priority than Idle Up. If the Remote P.T.O. feature is active the Idle Up switches are ineffective. The Idle Up or Stationary P.T.O. feature cannot be activated until the Remote P.T.O. relinquishes control

To operate the P.T.O. in this mode the vehicle must meet the following conditions:

- Be in "park" position ( vehicles equipped with automatic transmission)
- Upfitter provider (on/off) switch has been activated
- Parking brake applied (vehicles equipped with manual transmission)
- Clutch not depressed (clutch interlock switch)
- Vehicle must be running
- No transmission, engine, accelerator, brake or clutch switch faults present
- P.T.O. must be correctly installed using the vehicle provided circuits

**NOTE:** For application specific information with respect to P.T.O. and pump requirements and additional vehicle information (wiring schematics, preset idle values, engine speed limits, and vehicle hardware/ software requirements) please refer to the current RAM Body Builder's Guide "P.T.O. Operation & Installation Guide".

## Installation Instructions for 252 Series Dodge/Aisin (All Model Years)

The current Power Take-Off (P.T.O.) installation is from under the vehicle, an alternative method for Dodge has been developed with the help of Chelsea Products that allows the installation from above by removing the P.T.O. patch panel in the floor.

The installation instructions below are shown using a Dodge 4500 crew cab for installation, but applies to all Dodge work trucks. See Dodge upfitter web site for any changes to this installation information.

1. Unbolt the seat and move it to the rear of the cabin. (Fig. 1)

Figure 1

2. Remove the sill guards (rocker panel covers) passenger side to allow the floor mat to be lifted. They are removed by prying straight up to disengage metal clips. (Fig. 2)

Figure 2

3. Lift the floor mat and fold it rearward and towards the driver side to expose the patch panel (Fig. 3)

Figure 3

4. Remove the fasteners and sealer from around the patch panel. Cut away the sound deadener pad to expose the transmission P.T.O. access. (Fig. 4)

5. See installation of the P.T.O. for complete P.T.O. installation instructions on page 20-21 of this manual.

6. To assemble, reverse the above procedure (1-4) using RTV to reseal the P.T.O. floor pan patch panel.

Figure 4

## Installation Instructions for Dodge/Aisin (Continued)

### Under Vehicle Installation

7. To access the P.T.O. aperture on the right (passenger) side of the transmission, the exhaust pipe will need to be removed. (Fig. 5)

8. To make this process easier the following information is provided.

   The front end of the exhaust pipe at the turbo charger is secured with a V band clamp part number 52121895AB. It is tightened to a torque value of 150 inch pounds.

   At the rear of the pipe the M10x1.5 nuts are torqued to 43 Lbs. ft.

   The part number for the gasket that is located between the front pipe and the catalytic converter/ particulate filter (if it is damaged or lost) is 52122213AB.

   More specific instructions on removing and installing the exhaust pipe are available in the Dodge Truck service manual.

   If there are any additional questions related to this procedure please contact the Dodge Truck Body Builder Hotline at (866) 205-4102 or dodgebbg@dcx.com.

9. Install Power Take-Off as described on pages 20-21 of this manual.

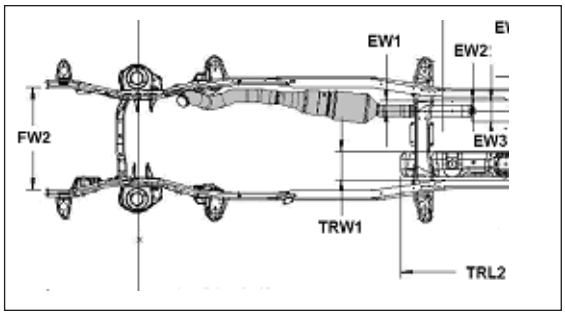


Figure 5



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission

1. Before mounting the P.T.O. remove the high pressure port plug located on the left side (drivers side of transmission) and install part number 379749 male connector fitting into port. Also install the 90° swivel nut (part number 379703) onto the male connector (379749) (Fig. 1).

   Connect hose and route to P.T.O. side of transmission

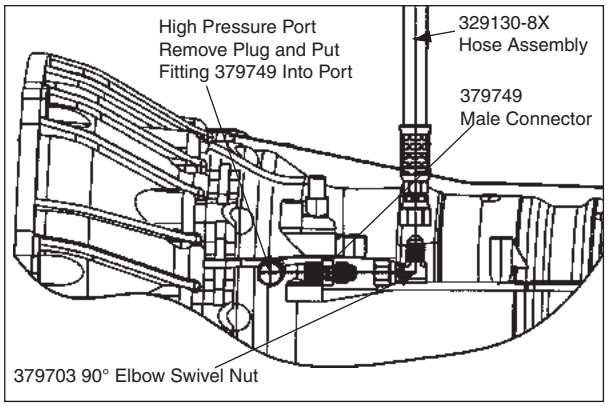


Figure 1

**NOTE:** Refer to "Installation Sketches SK-455 and SK-495 for complete wiring and plumbing instructions starting on page 25 of this owner's manual.

2. Remove the P.T.O. aperture plate from the transmission. (Fig. 2)

**WARNING:** Oil may be hot. Use extreme caution to ensure that you do not accidentally come in contact with hot oil.

Figure 2

3. Install the proper studs (379908 furnished with P.T.O.) in the P.T.O. aperture pad. The stud kit furnished with the P.T.O. contains five (5) studs and one (1) capscrew and have pre-applied locking/ sealing compound. Do not install a stud in the top hole on the aperture pad, this is for the capscrew (See Fig. 3) for proper placement of studs. Tighten studs securely and torque to 17-19 Lbs. ft. [23.05-25.76 N.m] (Fig. 3)

**CAUTION:** Over tightening of studs may damage stud and/or transmission threads.

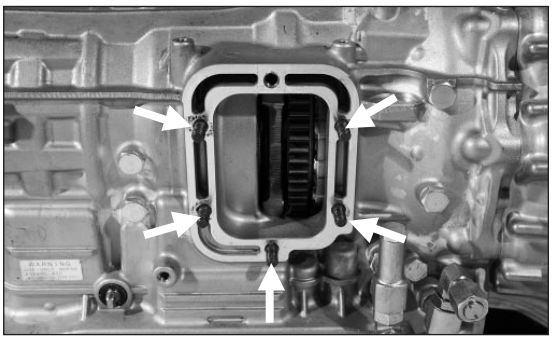


Figure 3

4. Place the gasket (35-P-41) provided with the P.T. O. over the studs (Fig. 4). Only one gasket is required because the 252 Series P.T.O. does not require the backlash to be set. (Fig. 4)

Figure 4

**This symbol warns of possible personal injury.**



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation of the P.T.O. to the Transmission (Continued)

5. Secure the P.T.O. to the transmission. Install the long bolt to the top hole in the P.T.O. and the flange nuts (provided with the P.T.O.) to the studs (Fig. 5).

**NOTE:** Flange nuts do not require lockwashers.

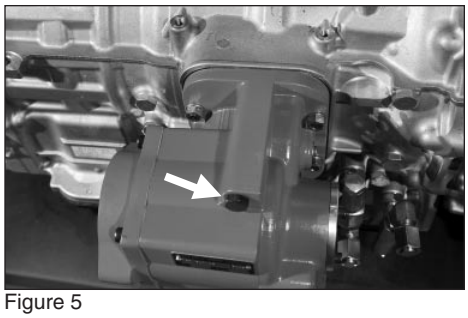


Figure 5

6. Torque the five (5) flange nuts (379744) to 35-40 Lbs. ft. [46-54 N.m].

   Torque the capscrew (379577-48) to 30-35 Lbs. ft. (Fig. 6)

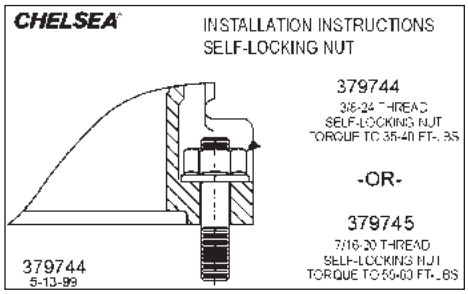



Figure 6

7. Attach hydraulic hose to P.T.O. (Fig. 7)

Figure 7

8. Connect electrical wires to P.T.O. (Fig. 8 and 8A)

   Connect the weather tight connector (black & white wire) with the GRAY plastic cover and the BLUE seal to the Solenoid valve. (Fig. 8)

   Connect the weather tight connector (two black wires) with the GRAY plastic cover and the GREEN seal to the pressure switch. (Fig. 8A)

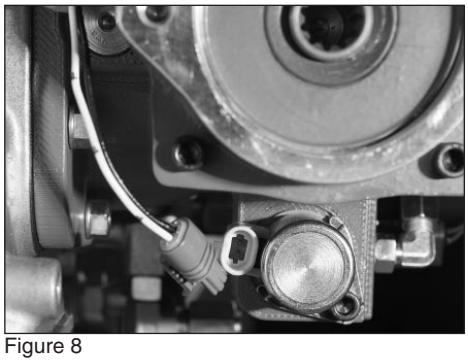


Figure 8

Figure 8A



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Wiring-MY2011 & Later RAM Chassis Cab

### Glove Compartment

1. Separate Upfitter Jumper Kit 68049501AB found in glove compartment
   - Wiring harnesses with plastic connectors are to be used in the cab
   - Eight 12-gauge wires with pins connected are to be utilized for wiring near Auxiliary Control Box (Aux Box) in engine compartment (Fig. 1)
   - Eight 20-gauge wires with pins connected are to be utilized for wiring into Transmission Connector Upfitter located near transmission (not used for basic P.T.O. install)

Figure 1

2. Of the eight 12-gauge wires with pins connected, separate the following four loose wires (Fig. 2):
   - K427 (Orange w/Light Green Stripe) Function = Aux_PTO_Control
   - F928 (Pink w/Yellow Stripe) Function = Aux_PTO_Power Output
   - Z907 (Black) Function = Ground
   - G425 (Violet w/Yellow Stripe) Function = Indicator

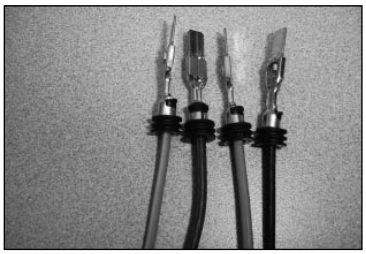


Figure 2

### Engine Compartment

3. There is a 2nd Ram wire K427 (12 ga. Orange w/Light Green Stripe) behind the Auxiliary Control Box located in the engine compartment. Locate wire and utilize a butt connector to connect the K427 (Orange w/Light Green Stripe) wire located in the engine compartment (Fig. 3) and the loose upfitter K427 (12 ga. Orange w/Light Green Stripe) with pin (Fig. 3a).

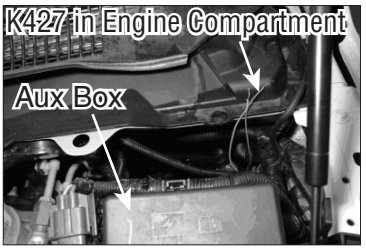


Figure 3

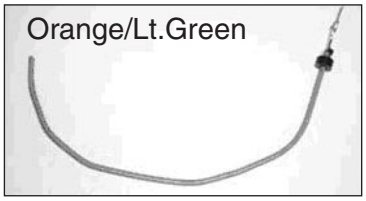


Figure 3a

4. Connect the Chelsea wires coming from the P.T.O. to the (3) loose Ram 12-gauge wires as follows:
   - Chelsea RED wire with heat shrunk blunt connector to Ram F928 (Pink w/Yellow Stripe)
   - Chelsea BLACK wire with heat shrunk blunt connector to Ram Z907 (Black)
   - Chelsea VIOLET wire with heat shrunk blunt connector to Ram G425 (Violet w/Yellow Stripe)

5. Locate the Light Gray connector in the engine compartment next to the Auxiliary Box. Separate male and female Ram Light Gray connectors (Fig. 4)
   - Remove four green weather plugs from the male connector
   - Insert K427 (Orange w/Light Green Stripe) into pin location #1 (Fig. 5)
   - Insert F928 (Pink w/Yellow stripe) into pin location #2 (Fig. 5)
   - Insert Z907 (Black) into pin location #3 (Fig. 5)
   - Insert G425 (Violet w/Yellow Stripe) into pin location #4 (Fig. 5)

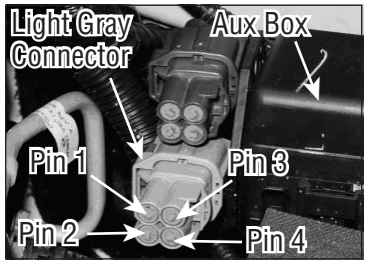


Figure 4

6. Reconnect male and female Ram Light Gray connectors

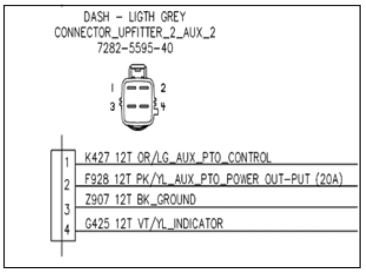


Figure 5



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Wiring-MY2011 & Later RAM Chassis Cab

### Under Dash in Cab

7. There are two open connectors underneath the dash, located on the driver's side by the parking brake that will be used for basic P.T.O. wiring installation. One 6-pin White connector and one 6-pin Light Gray connector (Fig. 6).

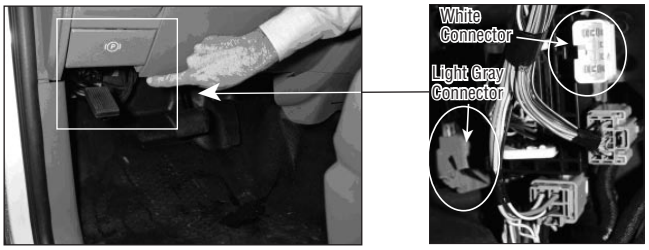


Figure 6

8. The White connector will attach to the wiring harness with the 6-pin black connector found in the glove compartment as part of the Upfitter Jumper kit Ram P/N 68049501 AB (Fig. 7)

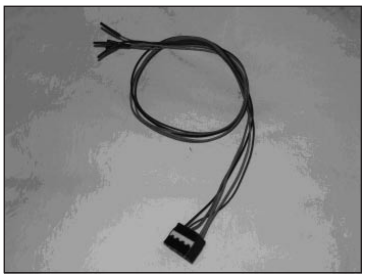


Figure 7

### Basic Stationary Mode

8A. For the wiring harness with BLACK male connector found in Upfitter Jumper kit Ram P/N 68049501 AB, connect the wires as follows:
- Remove wire cap from Ram wire K425 (Orange w/Brown stripe) pin location #1 and connect to Chelsea ORANGE wire with heat shrunk blunt connector.
- Remove wire cap from Ram wire V937 (Violet w/Brown stripe) pin location #2 and connect to Chelsea VIOLET wire with heat shrunk blunt connector.
- Secure BLACK male connector into WHITE female connector underneath the dash

Figure 8

### Remote Stationary Mode

8B. For remote stationary mode which allows the upfitter to set specific engine speeds upon P.T.O. engagement, the P.T.O. switch must be connected as follows on the RAM wire harness with BLACK connector.
- Chelsea ORANGE wire w/heat shrunk connector to Ram F425 (pink)
- Chelsea VIOLET wire w/heat shrunk connector to Ram V937 (Violet w/Brown stripe).

9. The Light Gray connector will attach to the wiring harness with the 6-pin Light Gray connector found in the glove compartment as part of the Upfitter Jumper kit Ram P/N 68049501 AB (Fig. 8)

9A. For wiring harness with Light Gray Male connector found in Upfitter Jumper kit Ram P/N 68049501 AB, connect the wires as follows:
- Remove wire cap from Ran wire G425 (Violet w/Yellow stripe) pin location #5 and connect to Chelsea YELLOW wire with heat shrunk blunt connector.
- Splice Ram wire F922 (Pink/Yellow) between pin locations #3 and #4 with Chelsea RED wire with blunt end DO NOT cut F922 Loop.
- Secure Light Gray Male connector into Light Gray Female connector underneath the dash.

## Wiring Charts - Model Year 2007-2010 Dodge Chassis Cab, 6.7L w/Aisin Transmission

### 2007 Wiring Chart

| | Chelsea Wire | Connected to Dodge Wire | Location |
|---|---|---|---|
| 1 | Orange | *K425 Orange w/Brown Stripe | Terminal #9, 10-way Connector on Bellhousing |
| 2 | Violet 1 | *V937 Violet w/Brown Stripe | Terminal #8, 10-way Connector on Bellhousing |
| 3 | Violet 2 | G425 Violet w/Yellow Stripe | Upfitter Jumper Connector** |
| 4 | Pink | F922 Pink w/Red Stripe | Upfitter Jumper Connector** |
| 5 | Orange | K427 Orange w/Lt. Green Stripe | Unterminated Wires Near Master Cylinder |
| 6 | Pink | F922C Pink w/Red Stripe | Unterminated Wires Near Master Cylinder |
| 7 | Black | Z914 Black | Unterminated Wires Near Master Cylinder |
| 8 | Violet | G425 Violet w/Yellow Stripe | Unterminated Wires Near Master Cylinder |
| | **Chelsea Wire** | **Connected to** | **Location** |
| 9 | Male Gray Connector w/Green seal | Pressure Switch | P.T.O. |
| 10 | Male Gray Connector w/Blue seal | P.T.O. Solenoid | P.T.O. |

* **NOTE:** These two wires must be cut from Dodge 10 way connector. Do not cut any other wires.

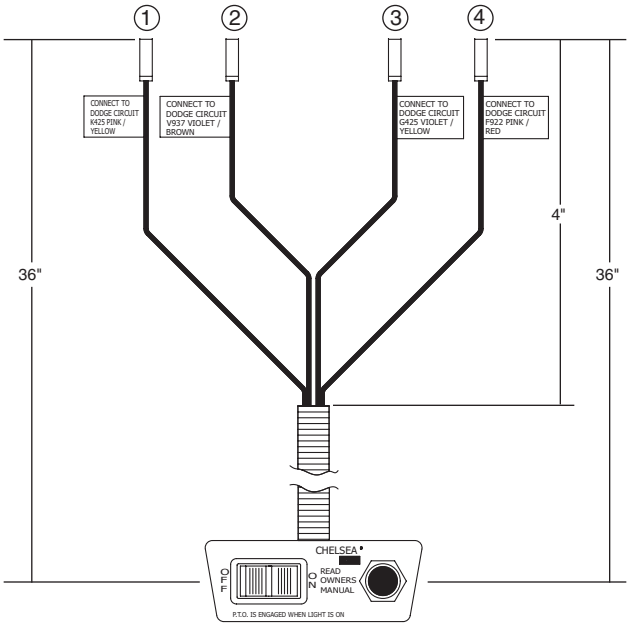
** **NOTE:** Stored in Vehicle Glove Box. Connect to Mating Plug under Instrument Panel Near Grommet.

### 2008-2010 Wiring Chart

| | Chelsea Wire | Connected to Dodge Wire | Location |
|---|---|---|---|
| 1 | Orange | K425 Pink w/Yellow Stripe | Upfitter Jumper Connector |
| 2 | Violet 1 | V937 Violet w/Brown Stripe | Upfitter Jumper Connector |
| 3 | Violet 2 | G425 Violet w/Yellow Stripe | Upfitter Jumper Connector |
| 4 | Pink | F922 Pink w/Red Stripe | Upfitter Jumper Connector |
| 5 | Orange | K427 Orange w/Lt. Green Stripe | Unterminated Wires Near Master Cylinder |
| 6 | Pink | F922C Pink w/Red Stripe | Unterminated Wires Near Master Cylinder |
| 7 | Black | Z914 Black | Unterminated Wires Near Master Cylinder |
| 8 | Violet | G425 Violet w/Yellow Stripe | Unterminated Wires Near Master Cylinder |
| | **Chelsea Wire** | **Connected to** | **Location** |
| 9 | Male Gray Connector w/Green seal | Pressure Switch | P.T.O. |
| 10 | Male Gray Connector w/Blue seal | P.T.O. Solenoid | P.T.O. |

**NOTE:** Wire Numbers on the Chelsea Wiring Chart are for Reference to Model Year Wiring.

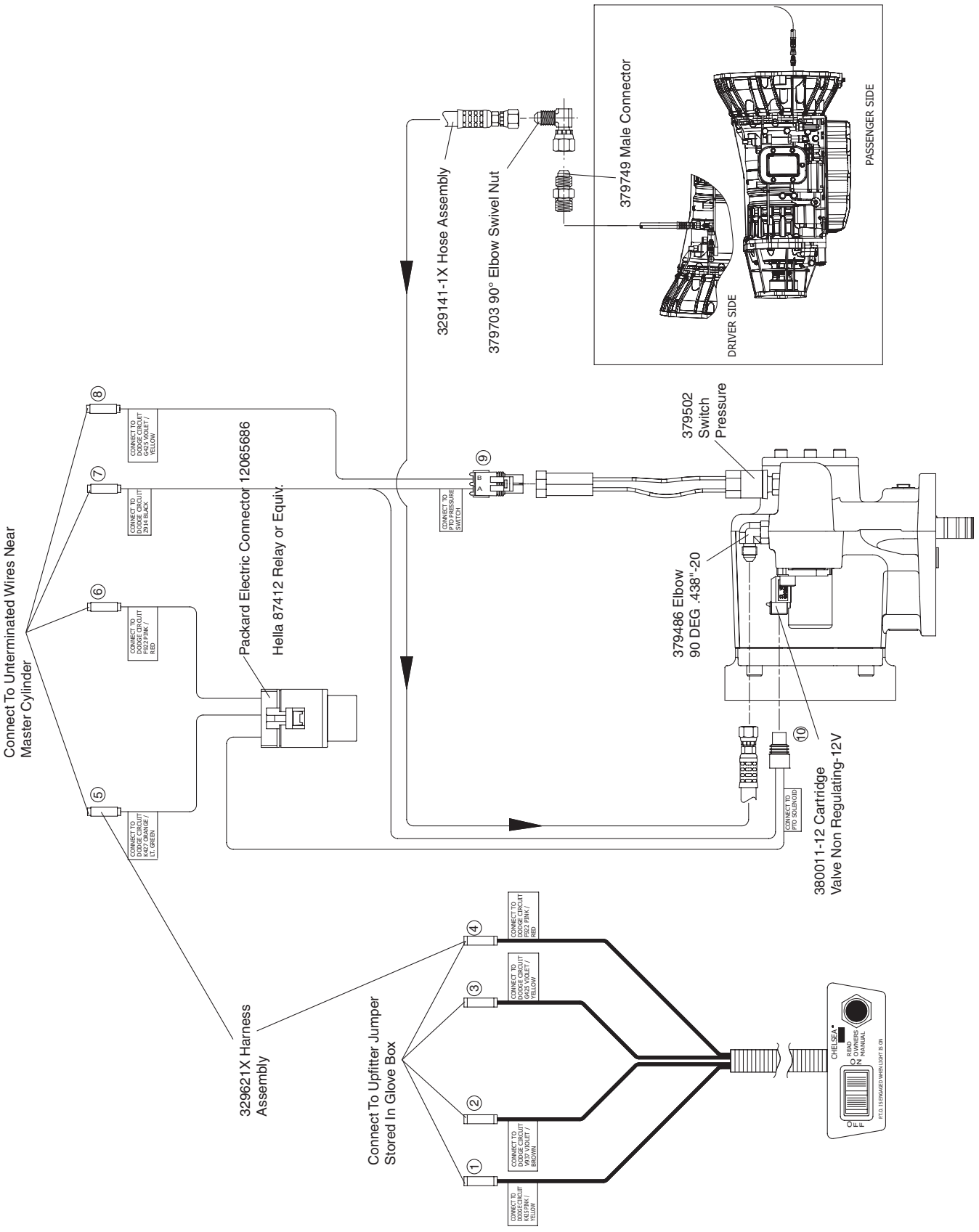
**NOTE:** Upfitter Connector is shipped loose with vehicle and is stored behind seat.






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation Sketch Dodge/Aisin Transmission (SK-455 Rev A)


379749 Male Connector
PASSENGER SIDE
DRIVER SIDE
329141-1X Hose Assembly
379703 90° Elbow Swivel Nut
379502
Switch
Pressure
379486 Elbow
90 DEG .438"-20
380011-12 Cartridge
Valve Non Regulating-12V
Connect To Unterminated Wires Near
Master Cylinder
Packard Electric Connector 12065686
Hella 87412 Relay or Equiv.
329621X Harness
Assembly
Connect To Upfitter Jumper
Stored In Glove Box
CONNECT TO DODGE CIRCUIT K457 VIOLET / YELLOW
CONNECT TO DODGE CIRCUIT 2514 BLACK
CONNECT TO DODGE CIRCUIT K63 PINK / RED
CONNECT TO DODGE CIRCUIT K457 ORANGE / LT. GREEN
CONNECT TO PRESSURE SWITCH
CONNECT TO PTO SOLENOID
CONNECT TO DODGE CIRCUIT K63 PINK / YELLOW
CONNECT TO DODGE CIRCUIT V937 VIOLET / BROWN
CONNECT TO DODGE CIRCUIT G425 VIOLET / YELLOW
CONNECT TO DODGE CIRCUIT P212 PINK / RED
CHELSEA
SEND FOR OWNERS MANUAL
PTO IS ENGAGED WHEN LIGHT IS ON

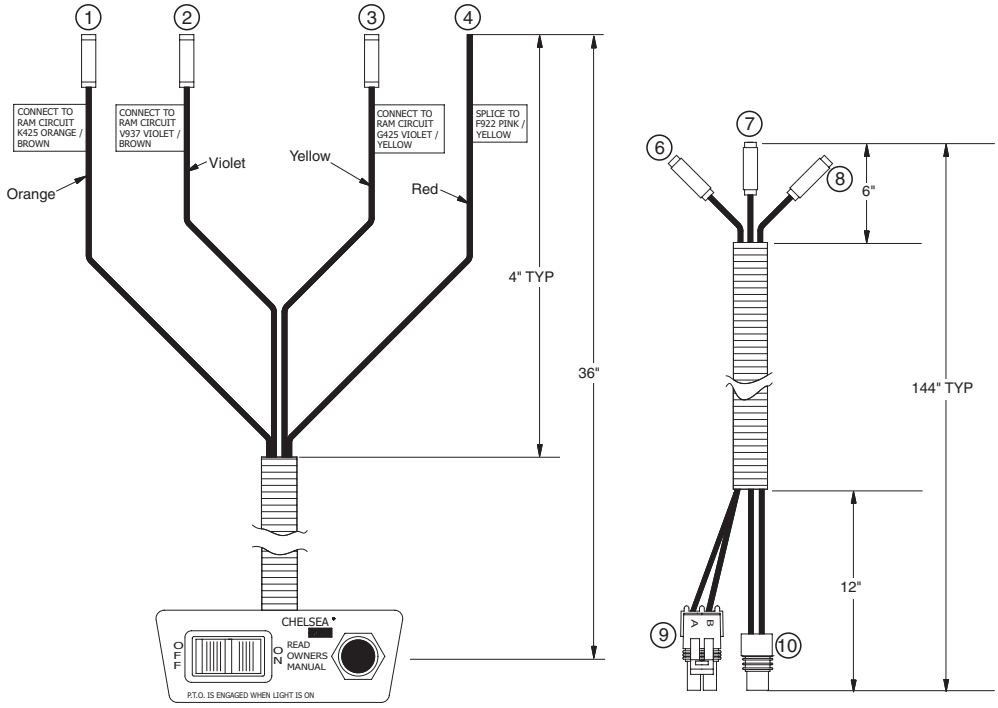


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Wiring Chart - MY2011 Ram Chassis Cab, 6.7L w/Aisin Transmission - 252 P.T.O. Series

| | Chelsea Wire | Connected to Ram Wire Harness | Ram Harness Connector Location |
|---|---|---|---|
| 1 | Orange | K425 Orange w/Brown Stripe (Blk Connector) | Upfitter Jumper White 6-pin Connector |
| 2 | Violet | V937 Violet w/Brown Stripe (Blk Connector) | Upfitter Jumper White 6-pin Connector |
| 3 | Yellow | G425 Violet w/Yellow Stripe (Lt. Gray Connector) | Upfitter Jumper Lt. Gray 6-pin Connector |
| 4 | Red | F922 Pink w/Yellow Stripe **Splice in** (Lt. Gray Connector) | Upfitter Jumper Lt. Gray 6-pin Connector |
| **NOTE:** 6-pin Male Upfitter Wire Harnesses are shipped loose with vehicle and is stored in glove compartment.<br>**NOTE:** 6-pin Female Upfitter Connectors are located under Instrument Panel near Emergency Brake | | | |
| | **Ram Wire** | **Connected to Ram Wire w/Terminal Ends** | **Ram Wire Terminal Location** |
| 5 | K427 Orange w/Lt. Green Stripe | K427 Orange w/Lt. Green Stripe | Upfitter Jumper Connector Lt. Gray to Lt. Gray 4-pin |
| **NOTE:** Ram K427 Orange with Light Green Stripe is located behind Upfitter Fuse Box near Master Brake Cylinder | | | |
| | **Chelsea Wire** | **Connected to Ram Wire w/Terminal Ends** | **Ram Wire Terminal Location** |
| 6 | Red | F928 Pink w/Yellow Stripe | Upfitter Jumper Connector Lt. Gray to Lt. Gray 4-pin |
| 7 | Black | Z907 Black | Upfitter Jumper Connector Lt. Gray to Lt. Gray 4-pin |
| 8 | Violet | G425 Violet w/Yellow Stripe | Upfitter Jumper Connector Lt. Gray to Lt. Gray 4-pin |
| **NOTE:** 4-pin Male Upfitter Connectors are shipped installed in Female Connectors near Master Brake Cylinder with Weather Plugs | | | |
| | **Chelsea Wire** | **Connected to** | **Location** |
| 9 | Packard Connectors (Violet & Black Wires) | Pressure Switch | P.T.O. |
| 10 | Packard Connectors (Red & Black Wires) | P.T.O. Solenoid | P.T.O. |

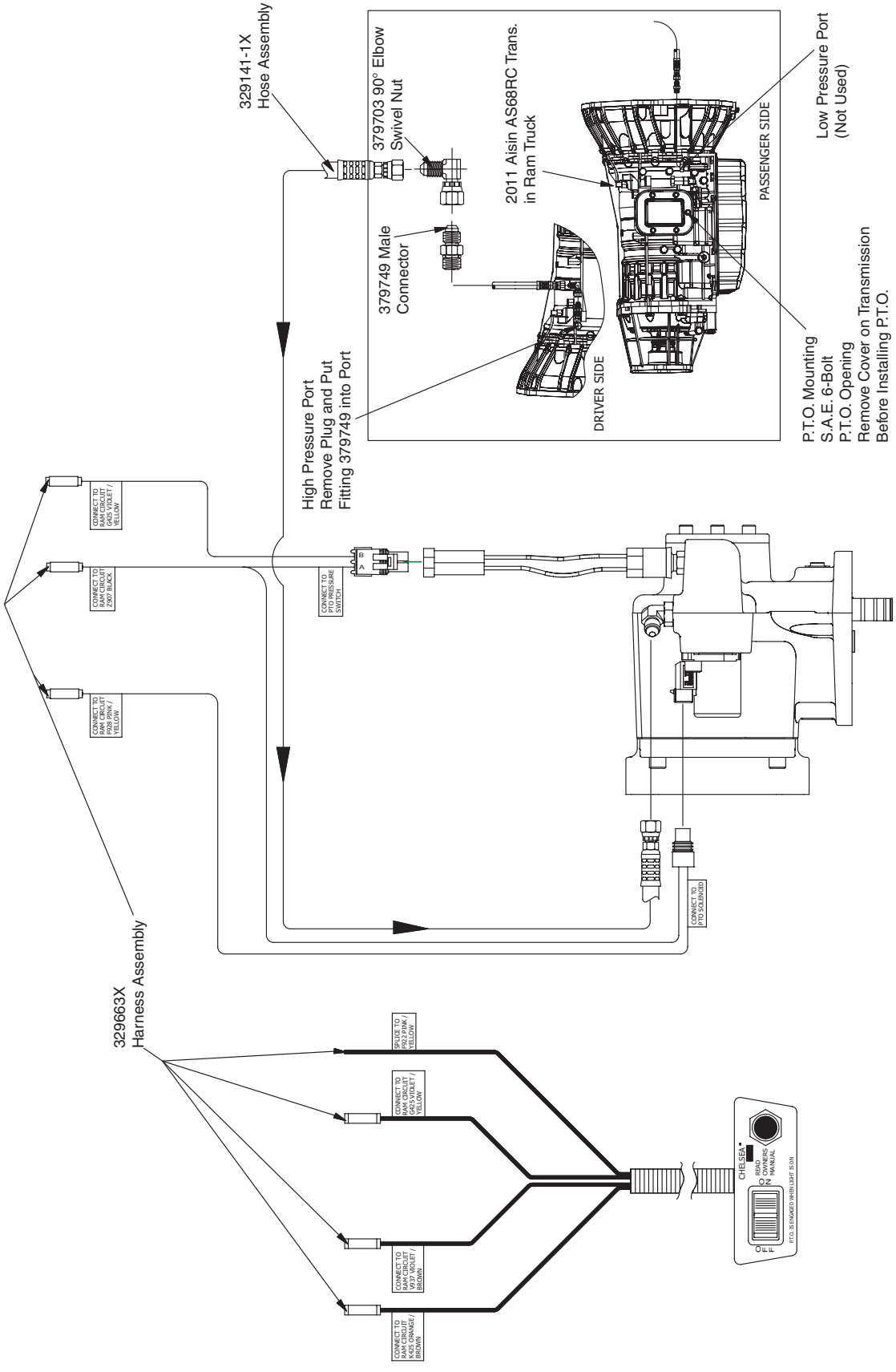
**NOTE:** Wire Numbers on the Chelsea Wiring Chart are for reference only.






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Installation Sketch w/o E.O.C. (MY2011 & Later) (SK-495)






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Power Take-Off Maintenance

Due to the normal and sometime severe torsional vibrations that power take-off units experience, operators should follow a set maintenance schedule for inspections. Failure to service loose bolts or power take-off leaks could result in potential auxiliary power-take-off or transmission damage.

Periodic P.T.O. MAINTENANCE is required by the owner/operator to ensure proper, safe and trouble free operation.

**Daily:** Check all air, hydraulic and working mechanisms before operating P.T.O. Perform maintenance as required.

**Monthly:** Inspect for possible leaks and tighten all air, hydraulic and mounting hardware, if necessary. Torque all bolts, nuts, etc. to Chelsea specifications. Insure that splines are properly lubricated, if applicable. Perform maintenance as required.

With regards to the direct mounted pump splines, the P.T.O. requires the application of a specially formulated anti-fretting, high pressure, high temperature grease. The addition of the grease has been proven to reduce the effects of the torsional vibrations, which result in fretting corrosion on the P.T.O. internal splines as well as the pump external splines. Fretting corrosion appears as a "rusting and wearing" of the pump shaft splines. Severe duty applications, which require long P.T.O. running times and high torque may require more frequent regreasing. Applications such as Utility Trucks that run continuously and are lightly loaded also require frequent regreasing due to the sheer hours of running time. It is important to note that service intervals will vary for each and every application and is the responsibility of the end user of the product. Chelsea also recommends that you consult your pump owners manuals and technical services for their maintenance guidelines. Fretting corrosion is caused by many factors and without proper maintenance; the anti-fretting grease can only reduce its effects on components.

Chelsea offers the grease to our customers in two packages. The first is a 5/8 fluid ounce tube (379688), which is included with every applicable P.T.O., and the second is a 14-ounce grease cartridge (379831). Chelsea also offers greaseable shafts for most all output designators.

**Warranty: Failure to comply entirely with the provisions set forth in the appropriate Owner's Manual will result in voiding of ALL Warranty consideration.**


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

# Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such items, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

**1. Terms and Conditions of Sale:** All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer, Acceptance of Seller's products shall in all events constitute such assent.

**2. Payment:** Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

**3. Delivery:** Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

**4. Warranty:** Seller warrants that certain Products, namely PTOs, SEMs, and Wet Line Kits sold hereunder shall be free from defects in material or workmanship for a period of twenty four months from the date of delivery to Buyer. Seller warrants that certain Products namely Pumps, and Hydraulic Accessories shall be free from defects in material or workmanship for a period of eighteen months from the date of delivery to the Buyer. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

**5. Limitation Of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.**

**6. Changes, Reschedules and Cancellations:** Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

**7. Special Tooling:** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

**8. Buyer's Property:** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property, Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

**9. Taxes:** Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

**10. Indemnity For Infringement of Intellectual Property Rights:** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

**11. Force Majeure:** Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

**12. Entire Agreement/Governing Law:** The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain there/to. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

10/09-P

# Sales Offices Worldwide

## North America

**Canada**
**Parker Hannifin Canada**
160 Chisholm Drive
Milton, Ontario L9T 3G9
Tel: (905) 693-3000
Fax: (905) 867-0789

**Mexico**
**Parker Hannifin Corporation**
Via de Ferrocarril a
Matamoros 730
Apodaca, N.L Mexico
Tel: (011) 52 81 8156 6000
Fax: (011) 52 80 8156 6076

## South Africa

**Parker Hannifin Pty Ltd**
Sales Company South Africa
10 Berne Avenue
Aeroport
Kempton Park
SOUTH AFRICA
1620
Tel: +9610700
Fax: +3927213

## South America

**Brazil**
**Parker Hannifin Industria e Comercio Ltda.**
Hydraulics Division
Av Frederico Ritter 1100
District Industrial
94930-000 Cachoeirinha
RS, Brazil
Tel: 55 51 3470 9131
Fax: 55 51 3470 6090

## Latin America

**Pan American Div**
7400 N W 19th St Suite A
Miami, FL 33126
UNITED STATES
Tel: (305) 470-8800
Fax: (305) 470-8809

## Europe

**Great Britain**
**Parker Chelsea Products**
**Parker Hannifin Limited**
Bldg 93, Vantage Point.,
Pensnett Estate,
Kingswinford, W Midlands, DY6 7FR
UNITED KINGDOM
Tel: (011) 44 1384 282777
Fax: (011) 44 1384 401851

## South Asia

**Chelsea Products**
**Parker Hannifin India Pvt. Ltd.**
TTC Industrial Area, Mahape
Navi Mumbai - 400 709, India
Tel: +91 22 6513 7081 - 85
ext 260
Fax: +91 22 2768 6841

## Asia Pacific

**Australia**
305 Frankston-Dandenong Road
Dandenong South, Victoria 3175
Tel: 61 3 9768-5555
Fax: 61 3 9768-5556

**Australia**
**Parker Hannifin (Australia) Pty. Ltd.**
9 Carrington Road
Castle Hill
New South Waltes, 2154
Tel: 61 2 9842-5812
Fax: 61 2 9842-5826

**Parker Hannifin Singapore Pte**
No 11 Fourth Chin Bee Rd
Jurong Town
SINGAPORE
619702
Tel: (+68) 87 -6300
Fax: (+62) 65 -5125

**Parker Hannifin Hong Kong Ltd**
8/f, Kin Yip Plaza
9 Cheung Yee Street
Cheung Sha Wan Kowloon
HONG KONG
Tel: (+02) 428-8008
Fax: (+02) 480-4256

**Parker Hannifin Motion & Control (Shanghai) Co., Ltd.**
280 Yunqiao Road, Jinqiao Export Processing Zone
Shanghai 201206, P. R. China
Tel: (+86) 21 6455 2002
Fax: (+86) 21 5463 1250

**Parker Hannifin Beijing**
Suite B9-B11
21/F Hanwei Plaza
No. 7 Guanghua Road
Chaoyang District
Beijing 100004, China
Tel: (+86) 10 6561 0520 - 5
Fax: (+86) 10 6561 0526 - 7

**Parker Hannifin Corporation**
Chelsea Products Division
8225 Hacks Cross Road
Olive Branch, Mississippi 38654 USA
Tel: (662) 895-1011
Fax: (662) 895-1069
www.parker.com/chelsea

FP 04/11 5C